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## UNDERLAYMENT MAT EMPLOYED WITH A SINGLE-PLY ROOFING SYSTEM

### CROSS REFERENCE TO RELATED APPLICATIONS

This is a divisional application of U.S. patent application Ser. No. 10/085,814, filed Feb. 28, 2002 now abandoned; which is a continuation of U.S. patent application Ser. No. 09/083,654, filed May 23, 1998 now abandoned, hereby incorporated by reference in their entirety.

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a mat, the purpose of which is as an underlayment for single-ply roofing membranes. Said mat may be woven or non-woven, spun bound or needle punched or constructed by whatever method best achieves the desired physical characteristics herein described at the most economical cost.

Further, this mat may be made of the following materials including but not limited to and either individually or combined: Various synthetic fibers; acrylic, rayon, nylon, polyester, foam, foam scraps, and or mineral fibers such as ceramic, glass, mineral wool, carbon, and slag wool fibers. These materials being made of either new raw materials and or from recycled materials may be selected for their hydrophobic properties. Further, this mat may be formed into rolls of various widths and lengths to facilitate handling on the roof and thus reduce labor.

#### 2. Description of the Prior Art

Roofing systems are well known, particularly, a roof deck which supports several layers of materials forming a finished waterproof roof surface over an enclosed space.

In commercial structures and other relatively flat roof structures, various materials are known and used in combinations for constructing a finished roof system. Generally, purpose is to provide one or more of the following critical functions as needed: separate the roofing material from incompatible materials in the substrate, providing insulation value, protect the roofing material from puncture or undue wear from irregular surfaces on the substrate, provide adequate support, and or provide a continuous, flat upper surface on which a roof membrane is applied.

In addition, existing roof systems are covered with a layer or layers of board stock insulation or the like. The purpose of the board stock insulation is often not to provide insulation but to act as a separator between the substrate and the new roof systems being installed.

In the roofing industry and with single ply roofs in particular, all accessory must be approved by the roof membrane manufacturer and as such are not just well known but a matter of record. The single ply prior art uses rigid uses rigid board stock materials as underlayment for the roof membrane exclusively. (Single ply refers to roof systems using a single sheet of waterproof material such as EPDM (synthetic rubber), PVC (polyvinyl chloride), or CPE (chlorinated polyethylene) to form the roofing as opposed to the built-up industry which uses multiple plies of asphalt felts or the like to form the roof membrane. Further asphalt is incompatible with single ply materials.)

Conventional board stock materials are well known in the roofing industry and their numerous inherent drawbacks have been accepted as part of the job since no other method or material has been made available. Some of the drawbacks of conventional board stock materials are: most are heavy and all

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are bulky, the largest available is 4'x8' which covers only 32 sq. ft., thus, it takes an army of men to transport and install them. Most rigid board stock materials will warp, shrink or swell and therefore must be secured in place with an average of one screw and plate per 4 sq. ft. Or mopped down with asphalt or special adhesive. They are rigid, and thus easily damaged in installation, storage, or handling. The edges and corners will turn up or break off. They are difficult to fit together and nearly impossible to cut and fit around roof penetrations, such as vents, pipes, ducts, etc. Most board stock materials are impossible to cut with a knife and must be cut with a power saw. A pattern of continuous joints is inherent in rigid board insulation applications. These joints impart mechanical stress to the roof membrane. Some require that the joints be taped and all require that any gaps over 1/4" be filled with similar material. The handling and cutting of board stock materials creates a good deal of job site debris and also a dust like material which makes breathing difficult. Most board stock insulations are sensitive to moisture and if exposed will deteriorate, warp or delaminate and must be disposed of. Some rigid board insulations contain HCFC's, CFC's, or other materials which either harm humans or the environment. When it comes time to re-roof, rigid boards must be removed and disposed of in landfills. Most rigid board stock materials being rigid, do not have the flexibility to absorb impact and thus the roof membrane must absorb the entire shock and thus the single ply membrane becomes punctured. These and other problems inherent to rigid board stock insulation materials are accepted by the roofing industry since there is no other material offered which will perform the functions required of an underlayment.

The prior-art illustrates an abundance of roofing systems particularly the single ply system which typically specify the use of rigid woodfiber board stock material or other rigid board stock insulation exclusively as underlayment.

U.S. Pat. No. 4,529,625, issued Jul. 16, 1985 to Reidenbach et al., discloses a fibrous sheet having one surface coated with asphalt as a method of making a roofing membrane.

U.S. Pat. No. 5,272,000, issued Dec. 21, 1993 to Chenoweth et al., discloses the method to manufacture a multi-layered, resiliently rigid nonwoven matrix of glass, synthetic and natural fibers into a blanket with good strength and insulating characteristics.

U.S. Pat. No. 5,246,760, issued Sep. 21, 1993 to Krickl discloses a multi-layered, batt consisting of sheepswool as a superior insulating element.

U.S. Pat. No. 5,458,960 issued Oct. 17, 1995 to Neiminen et al., discloses the materials needed and the method to manufacture a layered flexible base web having superior strength and insulation properties to be used as a construction covering.

U.S. Pat. No. 4,393,634 issued Jul. 19, 1983 to McDermott et al., discloses a roofing system made of an asphalt emulsion impregnated needle punched synthetic fabric.

U.S. Pat. No. 4,996,812 issued Mar. 5, 1991 to Venable discloses a method of attachment using a layer of adhesive to fully adhere the fleece backed waterproof membrane to the structure.

None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

### SUMMARY OF INVENTION

Accordingly, it is a principal object of the invention to replace the conventional board stock insulation or the like in a single ply roofing system with a mat which will meet the